

CLAIMS

The invention claimed is:

1. A method of detecting an interfering device in a wireless network, the method comprising:  
  
    comparing adaptive modulation information for a communication channel between at least two terminals in both an uplink direction and a downlink direction to determine if a difference exists; and  
  
    if a difference exists determining that a potential interferer is present in the wireless network.
2. The method of claim 1 wherein the communication channel utilizes orthogonal frequency division multiplexing (OFDM) and adaptive bit loading (ABL).
3. The method of claim 2 wherein the adaptive modulation information comprises modulation orders in the uplink direction and modulation orders in the downlink direction.
4. The method of claim 1 wherein the adaptive modulation information comprises adaptive power loading in the uplink direction and adaptive power loading in the downlink direction
5. The method of claim 1 further comprising determining the potential interferer to be located in a geographic region proximate to one or more network devices having a greatest magnitude of differences between uplink and downlink adaptive modulation information.
6. The method of claim 2 wherein one of the at least two terminals comprises an access point (AP) and wherein the wireless network comprises a wireless local area network (WLAN).

7. An apparatus for detecting an interfering device in a wireless network, the apparatus comprising:

an adaptive modulation component operative to adaptively modulate a signal according to a received requested modulation order; and  
a comparator communicating with the modulation component and adapted to identify a difference between adaptive modulation information in an uplink direction and adaptive modulation information in a downlink direction.

8. The apparatus of claim 7 further comprising a locator component configured to estimate a location of the interfering device relative to other network devices in the wireless network based on identified differences in adaptive modulation information in uplink and downlink directions for network devices communicating with the apparatus.

9. The apparatus of claim 7 wherein the apparatus comprises a wireless local area network (WLAN) access point (AP).

10. The apparatus of claim 7 wherein the adaptive modulation component uses orthogonal frequency division multiplexing (OFDM) and adaptive bit loading (ABL).

11. The apparatus of claim 7 wherein the apparatus comprises a hand held mobile unit.

12. A system for detecting an interfering device in a wireless network, the system comprising:

a transceiver operative to send and receive communications in multi-carrier signals including a plurality of modulated subcarriers; and  
a comparator unit coupled with the transceiver and configured to compare modulation orders for subcarriers in an uplink direction and a downlink

direction and identify, if any, a difference between the modulation orders for the uplink direction and the modulation orders for the downlink direction.

13. The system of claim 12 further comprising an omnidirectional antenna coupled to the transceiver and operative to broadcast and receive the multi-carrier signals.

14. The system of claim 12 further comprising a locator unit configured to identify an approximate location of the interfering device relative to other network devices in the wireless network based on differences in modulation orders in uplink and downlink directions for all network devices communicating with the transceiver.

15. The system of claim 12 wherein the multi-carrier signals are modulated using OFDM.

16. The system of claim 12 wherein the system comprises a WLAN AP.

17. A method of detecting an interfering device in a wireless network, the method comprising:

comparing adaptive modulation information for subcarriers between an uplink direction and a downlink direction to determine if a difference exists; and

identifying that a device is interfering if the difference exceeds a threshold value.

18. The method of claim 17 further comprising determining a location of the device proximate to a network device having a greatest magnitude of difference between uplink and downlink adaptive modulation information.

19. The method of claim 18 wherein comparing modulation orders and identifying that the device is interfering are performed at an access point.

20. The method of claim 19 wherein determining the location of the device is performed at a centralized location separate from the access point.

21. The method of claim 17 wherein the subcarriers are modulated as an OFDM signal.

22. The method of claim 17 wherein the wireless network comprises a WLAN.

23. A method of detecting an interfering device in a wireless network, the method comprising:

estimating one or more frequency dependent channel characteristics in a communication channel using modulated subcarriers for communicating between a first network device and a second network device;

determining a modulation order per subcarrier based on the estimated frequency dependent channel characteristics;

comparing modulation orders for communicating in both an uplink direction and a downlink direction between the first and second network devices to identify a difference.

24. The method of claim 23 wherein the communication channel utilizes orthogonal frequency division multiplexing (OFDM) and adaptive bit loading (ABL).

25. The method of claim 23 further comprising comparing adaptive power loading per subcarrier in the uplink direction and adaptive power loading per subcarrier in the downlink direction to identify a power loading difference .

26. The method of claim 23 further comprising estimating a location of a potential interferer to be located in a geographic region proximate to one or more

network devices having a greatest magnitude of difference between uplink and downlink modulation orders.

27. An apparatus for detecting an interfering device in a wireless network, the apparatus comprising:

a channel estimator configured to estimate one or more channel characteristics of a communication channel with a network device;

a modulation adaptor communicating with the channel estimator and configured to determine a modulation order for the network device to modulate subcarriers based on the estimated frequency dependent channel characteristics; and

a comparator communicating with the modulation adaptor and configured to compare modulation orders of subcarriers in an uplink direction with modulation orders of subcarriers in a downlink direction with the network device and identify, if any, a difference between the modulation orders for the uplink direction and the modulation orders for the downlink direction.

28. The apparatus of claim 27 wherein the apparatus comprises a wireless local area network (WLAN) access point (AP).

29. The method of claim 27 wherein the modulation adaptor uses orthogonal frequency division multiplexing (OFDM) and adaptive bit loading (ABL).

30. The apparatus of claim 27 wherein the apparatus comprises a hand held mobile unit.